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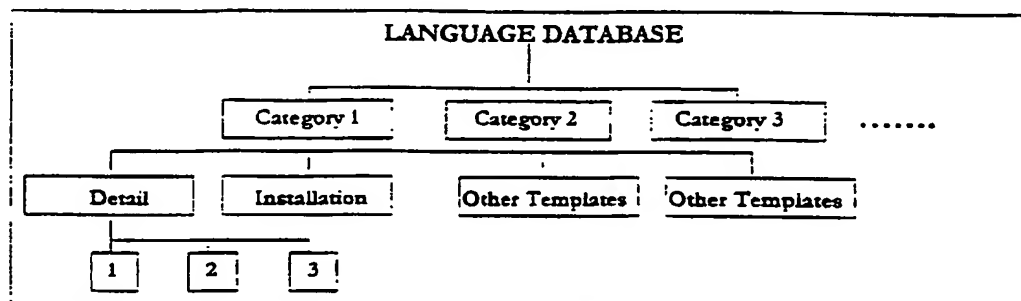
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(54) Title: INTERACTIVE SYSTEM FOR PRODUCT SELECTION



(57) Abstract: An interactive product selection guide includes a hierarchical database with a unique part number and each product, and each part number assigned to a specific node in the hierarchy. Keywords identifying the product, such as product attributes and applications, are associated with the part number. A user can quickly identify products by application and/or keywords using a search facility. Information relating to the identified product is formatted using a template associated with the product display in the form of a dynamically formatted HTML page. The templates include components in the form of graphics, numeric information, and text with embedded numeric data. Information applicable to more than a single product is stored as a single component and invoked by a template specific to each product. An "intelligent" product selection guide ensures that a user identifies at least one product by the end of the selection process.

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INTERACTIVE SYSTEM FOR PRODUCT SELECTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates to interactive computer-enabled processes for identifying and selecting products.

2. Brief Description of the Prior Art

 Interactive, computerized catalog systems are known. For example, U.S. Patent 5,721,832 discloses an interactive, computerized electronic catalog
10 system for selectively displaying at a customer/user's telephone terminal interactive catalog data selected by the user. Catalog data, including graphic and audio message data, is stored and indexed in a central data processing system. Memory means are provided for storing and selectively retrieving specific portions of retail catalog data at the request of a user. At his telephone
15 terminal, the user employs an on-line interactive service control processor to request specific catalog data. The user telephone terminal and the central data processing system are joined by a communications link. A user data profile data processor is employed, when authorized by the user, to selectively generate customer profile data. Order processing means are provided for responding to a
20 user order, and for completing the accounting and delivery tasks associated with a catalog order.

 Automated systems for configuring systems comprised of a number of components are also known. For example, U.S. Patent 5,825,651 discloses a
25 method for interactively configuring a product among a set of related products based on availability and compatibility of features and options. Each product in a product line is comprised by a set of parts, and each part can be classified as included by default, required by choice, or optional. Further, sets of parts can be classified by their relationships to one another within a particular product. For example, some parts may be required, others may be substitutes for one
30 another, and still others may be excluded from the specific product configuration. A graphical user interface is provided to permit a user to interactively define a product from sets of component parts, with a configuration system operating to validate user input based on the then current configuration.

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The configuration system removes parts that, if chosen, would result in an invalid configuration. The invention provides both external and internal representations of elements in the configuration. The internal representation is expressed as vectors for choices and tables for relationships.

5 International Patent Publications WO 97/27554 and WO 97/27522 disclose use of an electronic catalog of electronic components for use in mounting components on printed circuit boards.

U.S. Patent 5,870,717 discloses a system for ordering items over a computer network using an electronic catalog.

10 U.S. Patent 5,898,594 discloses an electronic catalog adapted for use in a video rental context by selectively omitting items a particular customer has already viewed from a catalog instance viewed by the customer.

U.S. Patent 5,630,125 discloses a method for information management useful for electronic catalogs and using an open hierarchical data structure. The
15 data structure has a plurality of nodes and information objects. Multiple paths connecting nodes to information objects at the ends of the paths. Selection menus corresponding to the paths are dynamically built.

U.S. Patent 5,319,542 discloses a system for ordering items using a private electronic catalog derived from a public catalog and a supplier's master
20 catalog.

S. Danish and P. Gannon, Building Database Driven Web Catalogs (McGraw-Hill 1997) discloses a marketing product data management database for use in providing dynamic, interactive catalogs over the World Wide Web.

Interactive product catalogs have been provided in the form of compact
25 discs, such as the ZOOM interactive product selection guide distributed by Southco, Inc. Such CD-based product catalogs may include a database of product information, and software to control the sequence and presentation of the product information to the user. Because of the relatively high data transfer rate from the CD, substantial multimedia capabilities can be provided.

30 Multi-tier electronic commerce web sites offer the ability to interactively identify, select and purchase products over the World Wide Web. Such sites typically include a database server as a first tier, a web server as a second tier, and a conventional web browser on the client side. The web server obtains product information from the database server and provides it, typically in the
35 form of HTML pages, to the client browser. Because of the relatively low

average data transfer rates experienced over the web, the multimedia capabilities of such sites have been limited.

SUMMARY OF THE INVENTION

5 The present invention provides an interactive product selection guide ("ISPG") process and system for choosing a product. The invention also provides an interactive, on-line catalog.

10 The invention provides a hierarchical database including a plurality of levels and nodes. Each product is assigned a unique part number, and each part number is in turn assigned to a specific node in the hierarchy. Keywords identifying the product, such as product attributes, are preferably identified and associated with the part number. Similarly, applications for which the product can be used are identified and descriptions of each application are preferably associated with the part number. The keywords and application descriptions are
15 preferably provided in each of several target languages. A search facility is provided so that a user can quickly identify products by application and/or keywords.

20 Once a relevant product has been identified, the present invention assembles information relating to the product for display to the user. The product-related information is stored in a database, and preferably assembled by an SQL call. Textual information related to the product is preferably provided in each of the supported languages.

25 A template associated with the product is used to format the information for display, preferably in the form of an HTML page. Each HTML page is formed dynamically, from one or more templates. The display templates are organized into categories depending on their type. Each template includes at least one component, which can be text, a graphic, numeric information, text with embedded numeric data, or another data type. Again, textual information is preferably provided in each of the supported languages.

30 The use of templates advantageously reduces that volume of information that must be stored and maintained. Information applicable to more than a single product can be stored as a single component and invoked by a template specific to each product. Thus, product line extensions involving changes to only a few product specifications can be easily accommodated.

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The present invention provides an "intelligent" product selection guide that ensures that a user identifies at least one product by the end of the selection process. It is not possible for the user to choose a set of selection criteria that result in no products being identified. Thus, the user can advantageously identify available products very quickly, and avoid "dead ends."

The present invention also provides a product database management system that permits rapid and facile maintenance of the product selection system to add and remove products from the hierarchy; modify the nature and description of the product attributes and applications and corresponding universe of possible selections; add text description in additional languages, et al.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an abstract, schematic representation of organization of the language database of the present invention.

Figure 2 is a graphic representation of the class diagram for the Language Data Maintenance module of the present invention.

Figure 3 is a graphic representation of the class diagram for the Hierarchy and HierarchyNode classes.

Figure 4 is a graphic representation of the class diagram for the Features, Notes module.

Figure 5 is a graphic representation of a start-up or "home" page of the system of the present invention to be displayed to a user.

Figure 6 is a graphic representation of a main menu page of the system of the present invention to be displayed to a user.

Figure 7 is a graphic representation of a category selection page of the system of the present invention to be displayed to a user.

Figure 8 is a graphic representation of a product class selection page of the system of the present invention to be displayed to a user.

Figure 9 is a graphic representation of a selection criteria page of the system of the present invention to be displayed to a user.

Figure 10 is a graphic representation of a selected product list page of the system of the present invention to be displayed to a user.

Figures 11a and 11b provide a graphic representation of a selected product detail page of the system of the present invention to be displayed to a user.

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Figure 12 is a graphic representation of a portion of the hierarchy for a specific product class.

Figures 13 and 14 are graphic representations of a Hierarchy Maintenance page of the Product Database Management system of the present invention to be displayed to a user.

Figure 15 is a graphic representation of a Template Manager - Edit page of the Product Database Management system of the present invention to be displayed to a user.

10 DETAILED DISCLOSURE

The present invention provides a means for providing a customized interactive catalog at a remote site, and an associated process for interactively identifying and selecting products.

Providing pictorial representations of the products enhances product catalogs. In printed and CD-ROM based catalogs the pictorial representations of products are fixed at press time. The Internet has provided an opportunity for retailers and other product vendors to deliver up-to-date representations of the products offered. A pictorial representation of a product (for example, the cover of a book) can be stored as an image file on the vendor's web server, and provided as an element of an HTML page in response to an inquiry made by a sales prospect through her web browser. The image files can be updated continuously, as can textual and other information about new and updated products, and the vendor's web site can thus approximate a continuously updateable catalog. In the past this process has often been implemented by creating a new HTML page for each new product, and revising the control structure for the web site to permit access to the new HTML page. This web site maintenance process, which requires a fairly high level of technical skill and familiarity with HTML, has proven a costly endeavor, especially for vendors offering a large number of products.

Another complication arises when products available in a variety of models are offered for sale over the web. Many if not most manufactured products are assembled from multiple component parts. With respect to a specific product, individual component parts may be classified as being "required," "optional," or "selectable." For many products, many if not most components will be "required." For example, a hypothetical product may

comprise a chassis, a motor, and several fasteners, all of which are required for every model of the product. Other components may be "selectable" from a range of alternatives. For example, the hypothetical product may include a cover which is required but which is fabricated from stock available in a variety of colors and finishes. Optional accessories may also be attachable to the product. As the number of selectable and optional components increases linearly, the number of combinations increases geometrically. A similar problem arises when a single product is available with a number of selectable attributes, such as the product size, the product finish, the product color, etc. To provide a separate HTML page for each combination could be an extremely costly and difficult undertaking in such cases.

Another significant source of complication for web-based vendors has been the internationalization of the Internet. To effectively sell around the world, vendors seek to provide information in the languages of their prospects. The conventional approach to this challenge has often been to provide a parallel set of HTML pages for each target language, substantially complicating site maintenance.

An important problem associated with the on-line search process relates to the unpredictability of results encountered with multiple criteria queries for products. Often substantial skill or experience with a specific database is required before queries can be formulated efficiently to select products. Too often queries are formulated with criteria that are not sufficiently selective, resulting in the selection of too many more products than can be seriously considered. On the other hand, very often queries are formulated with criteria that are not selective enough, resulting in a failure to identify any products at all. This under- and over-selectivity can be very frustrating for the user, and likely to lead to a lost sale. Worse yet, it may sometime appear to a user that a slight adjustment in selection criteria results in going from too many products to no products at all.

The present invention provides solutions to these problems. The present invention provides means for providing dynamically constructed HTML pages employing templates, and using a minimal set of image and text files. HTML pages for products manufactured from multiple components and/or available in multiple variations, can be dynamically constructed from images and text information characteristic of the components. Similarly, HTML pages can be

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dynamically constructed using text in a language comprehensible to the sales prospect.

In one aspect, the present invention provides an "intelligent" product selection guide that ensures that a user always arrives at at least one product after the selection process has been completed.

5 In one embodiment of this "intelligent" product selection guide, the user is presented with a set of attributes characteristic of a class of products, with each attribute having a range of associated values. The user then selects a value for each attribute in a stepwise manner. At each step when the user selects a value
10 for a specific attribute, the product selection guide limits the selectable values associated with the remaining unselected attributes to those consistent with actual products.

The present invention also provides means for easily updating and modifying the underlying product database using conventional database
15 techniques such that subsequently HTML pages displaying the new or modified information are dynamically provided without web-master attention or intervention.

The present invention is preferably implemented in a platform-independent language such as Java, although proprietary means of providing
20 database information over the Web can also be used, such as Microsoft Corporation's Active Server Pages technology.

In the presently preferred embodiment, the present invention can be implemented as a collection of database tables, preferably in a highly scalable Web-friendly environment, such as provided by Oracle 8i.

25 The database tables include information associated with each specific component employed in manufacturing a multi-component product.

In this embodiment, the Oracle Database Server, the Oracle Application Suite (OAS) and the Oracle Client software are installed and set up on a suitable mainframe computer, such as a Hewlett-Packard HP 9000 Enterprise Server or
30 HP NetServer system employing a suitable operating system such as Microsoft Window NT or HP-UX (Unix). Application programs or scripts for generating HTML can be prepared using Perl CGI, PL/SQL, Java or another language.

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In a presently preferred embodiment, the present invention includes a plurality of model classes with associated variables, attributes and methods and associated tables.

5 The present invention is preferably implemented as a set of code modules including associated functional specifications, data tables and a class model for the module. Individual modules can be associated with a specific product group, or can be common to all groups.

Conceptually, the language or text data is preferably organized into a database that is divided into various Product Categories. These Product
10 Categories are based on a pre-defined generic hierarchy that is transparent to the user, and which the user cannot alter. Each Product Category has a list of associated templates, with each template providing a single screen or a group of screens for presenting information. The Templates include templates for generating menus, lists, product details, and installation instructions. Each of
15 the templates has a number of language components associated with the template, such as text, pictures, and numeric data that must be shown and/or formatted differently in different languages. Every language component exists in association with a template, and no component can exist without a link to a template. The design can be shown graphically as is provided in Fig. 1.

20 An example of one such module is the Language Data Maintenance module. The primary function of this module is to manage a list of product categories based on a broad classification of the products being sold. For example, the list of product categories can coincide with an existing set of product classes such as the product class numbers provided in the Southco
25 Latches and Access Hardware handbook. Management of such a list includes the ability to add, edit and delete items from the list. Another important function of the Language Data Maintenance module is to manage a list of templates for screen compositions. Yet another function implemented is to manage a list of discrete components to provide for repetition and re-use of language
30 components to avoid repetitive or duplicative table entries.

In addition, the Language Data Maintenance module provides a number of secondary functions. These include means for consistently editing text descriptions in each language implemented, report generation facilities for documenting language component changes, multi-language spell-checking
35 facilities, back-up utilities, et al.

Alternatively, the templates can be generated by a suitable development tool such as Cold Fusion 4.0 web application server environment available from Allaire Corp.

5 The Language Data Maintenance module includes several tables. For example, the PL_GENERIC_HIERARCHY table stores a list of product categories, based on the classification of existing products.

10 The TEMPLATE_HEADER table maintains a list of all templates. The templates are HTML templates used for generating screen compositions, and include templates for generating on-screen lists, menus, graphics, etc. on the client browser. Each template is assigned to a specific category, employs one or more "language" components, and provides formatting information.

15 The TEMPLATE_DETAIL table provides an interface between each template and the various components used by each template. A component can be any one of several types, including Text, Picture, Numeric, Text With Embedded Numeric, et al.

20 The COMPONENTS table stores the actual components. For text components, the text is provided in each of the languages supported, for example, English (American), English (British), French, German, Italian, and Spanish. Other languages can also be supported, and the components are preferably structured to provide for the addition of at least six languages in addition to those exemplified above. For Numeric components, the number value is provided in both English system and metric units, along with tolerances expressed in either system of units. A field is also provided for each of the supported languages for a flag to signify that a change has been made to the text of the respective language field. This feature eases maintenance of the Text components and helps assure consistent descriptive information in each of the supported languages. In the case of Picture components, a field is provided for a pointer to the actual image file. A log table is also provided to store a record of the changes made to the components.

30 The class model for the Language Data Management module provides for a Screen Manager Class for use in managing the various categories, and for accessing the templates and components. The class model is depicted in Figure 2. The Screen Manager Class has only a single instance, and includes a method for setting the language to be used in each component of the template.

35 In addition, Category, Template and Component classes and corresponding

objects are provided. The Template class includes methods for managing components, including adding and deleting specific components for each template instance, as well as loading all the components for each template instance. The Category class includes methods for managing and loading
5 templates. The Components class provides a collection of component instances, and enables access to a particular component. Methods for loading all of the components associated with a template and for finding components are provided.

Another important module is the Product Hierarchy Maintenance module.
10 This module implements functions for adding new nodes to the product hierarchy, editing existing nodes, and deleting unused nodes. In addition, individual nodes can be moved from one level to another level, or to another sequence on the same level. The sequence of existing nodes can be changed. Facilities for searching on the hierarchy name or description and for obtaining a
15 detailed view of a specific node are also provided.

The product hierarchy includes eight levels and is expressed in three tables, a HIERARCHY_MAIN table that includes a row or vector for each node in the hierarchy, a PL_HIERARCHYTEXT table that includes descriptions for each hierarchy node in multiple languages, and a HIERARCHY_LEVEL_DETAIL table
20 provides detail level information for each node of the hierarchy.

The HIERARCHY_MAIN table includes fields for a unique node identifier, as well as for an identifier for the parent node, codes for the node name and description, and pointers to photos of the product and optional list tables.

The Hierarchy class includes a plurality of methods for maintaining the
25 hierarchy tables, including procedures for adding and editing descriptive text to the PL_HIERARCHYTEXT table, and procedures for adding, updating, deleting and translating nodes in the hierarchy. Class diagrams for the Hierarchy and HierarchyNode classes are provided in Figure 3.

Detailed information about specific products and their components is
30 provided in another module, the Features, Notes module. The class diagram for this module is provided as Figure 4. This module provides functions to manage a list of codes and hierarchy codes associated with the features and notes for each of the products. The database tables for this module include the PL_FEATURES table and the PL_NOTES table. Records for each of these
35 tables include a unique code generated from the part number, as well as

descriptions of the product features or notes for the product in each of the supported languages, and a set of flags for indicating changes in the descriptions. In addition, tables are provided for product strength and material finish descriptions, PL_PRODUCT_STRENGTH and PL_MATERIAL_FINISH, which respectively contain notes regarding product strength and material finish in each of the supported languages. The class model for this module includes a Common_PI_Manager class, with associated functions for managing Feature-Lists class instances. Also included are a Features-Group class having associated functions for loading related data, and a Feature class.

10 The Product Top Table Maintenance module plays a key role in this embodiment of the present invention. This module provides means for adding a new part number and its associated keywords and applications to the database, as well as other management functions such as editing existing part numbers and their associated keywords and applications. In addition, facilities are
15 provided for searching on keyword and applications, viewing a specific part number and its details, and moving a specific part number from one HierarchyNode to another are provided.

 The tables associated with the Product Top Table Maintenance module include the TOP_TABLE table that holds part numbers and the associated
20 identification of the hierarchy node to which the part number belongs. A PL-KEYWORDS table ("PL" = "predefined list") includes a unique identification number for each keyword and a description for each keyword in each of the supported languages. Similarly, a PL_APPLICATIONS table provides a unique identification number for each application and a description of the application in
25 each of the supported languages. The part numbers and the keyword identification numbers are associated in a PARTNUMBER_KEYWORD table that maintains a many-to-one relationship with the PL_KEYWORDS table for the keyword identification number and a one-to-one relationship with the TOP_TABLE table for the part number. Similarly, a
30 PARTNUMBER_APPLICATION table maintains a many-to-one relationship with the PL_APPLICATIONS table for the keyword identification number and a one-to-one relationship with the TOP_TABLE for the part number. Thus, a part number can have multiple associated keywords and multiple associated applications.

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Use of the presently preferred embodiment of the product selection guide of the present invention can be explained with reference to Figures 5 - 11, in which like reference numerals refer to like elements in each of the several views. Figure 5 illustrates a start-up or "home page" 10 to be displayed to the user.

5. Depending on the specific implementation of the process and system of the present invention, the "home page" can be provided to a user's web browser (such as Microsoft Corporation's Internet Explorer or Netscape's Navigator browser) in response to a URL request generated by the user, as by clicking on a hyperlink to the home page, such as a hyperlink appearing in a page abstract
10 generated by a search engine. Preferably, the home page, and the other pages provided to the user according to the process and system of the present invention, are generated by application server software, such as Oracle Application Server 4.0, and provided over a network, such as the internet, or an intranet or extranet, to a client computer running a browser.

15 In the presently preferred embodiment, the language selection page 10 comprises the principal entry point to a web site implementing the process and system of the present invention. If desired, the language selection page can include means for identifying the user, such as an input box for the user's name, an input box for the user's password, or other characteristic information (not
20 shown).

The language page and other pages of the site are preferably provided to the user's browser in HTML format, although other browser-recognizable formats can be employed, such as XML, or other versions of SGML. To maximize compatibility with the widest possible range of users' browsers, a
25 version of HTML employing minimal or preferably no proprietary language extensions is employed. Alternatively, or in addition, the language selection page and other pages preferably include browser-specific means for implementing proprietary extensions such that comparable content is displayed for as many different types and versions of browsers as possible.

30 The language selection page 10 and other pages of the site are "interactive" pages in the sense the pages displayed to the user after the home page depend upon input from the user. Persistence of the user's choices during a product selection session can be provided through writing browser-mediated "cookies" to the client computer.

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In addition to conventional HTML tags, the site pages may include additional code provided in a scripting language such as Javascript or VB Script, thereby providing the ability to respond to user input or other "events."

In anticipation of an international group of users, the home page 10 provides a set of controls 12 so the user can select the language in which he or she wished to appear in the text provided on each of the pages of the site.

The home page 10 also preferably includes a menu bar 14 including a plurality of controls 16 for general navigation within the site. The menu bar 14 preferably includes controls for returning to the home page, for dispatching an e-mail to the owner of the site, for displaying a page listing new events or enhancements to the site, for displaying general information about the owner or sponsor of the site, etc. The menu bar 14 can optionally be displayed on each page on the site, to provide the same functional capabilities to the user.

Selection of the language is an event triggering display of the next page, the main menu page 20, shown in Figure 6. The main menu page 20 presents the user with products grouped by general product structure or function. This constitutes the top-most level of the product functional hierarchy. For example, in the case of access hardware, products groups could include compression latches, push-to-close latches, pawl latches, hinges, multi-point latching systems, captive fasteners, quarter-turn fasteners, drive rivets, et al. Text-based controls 22 are provided to permit the user to select the specific class of products in which she has an interest. In addition, graphic selection means 24 are also preferably provided to permit a user familiar with the appearance of the desired product class to select an appropriate product class. The graphic product selection means can include a plurality of product illustrations such as photographs or artist's renderings of representative members of the product classes. In a presently preferred embodiment an image of a representative product is displayed in response to the user's passing the mouse pointer over a list of the product group names. This method advantageously reduces the graphic clutter of the page by displaying only a single image at a time to the user, and also helps teach a new user the product group name syntax employed on the site.

In general, the user makes selections in a conventional manner, as by single or double clicking the left mouse button on the desired hyperlink or associated graphic.

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The main menu page 20 also preferably includes a menu bar 26 including a plurality of controls or links 28 for general navigation within the site, as similarly provided for the home page 10. In addition, the main menu page 20 includes a second group of controls or links 30 listing the product groups in a simple list format so that an experienced user can rapidly make a selection. The main menu page can also include a third set of controls or links 32 in a simple list format for providing additional services to the user. For example, more specific or technical information can be provided through a control or link on the main menu page, as can warranty information, information about available product finishes, information about performance standards, information about the availability of modifications to standard products, a glossary of terms used in connection with products of this type, and the like.

Selection of a product group by the user by activating an associated control on the main menu page 20 triggers the display of a product category selection page 40, shown in Fig. 7, providing the user with a plurality of product categories falling within the one of the broad product groups displayed on the main menu page 20. For example, should the user select the product group "captive fasteners" on the main menu page, the product category selection page could display product categories including captive screws, captive nuts, inserts, fast-lead thread screws and spring-loaded plungers, each category falling within captive fastener product group with reference to functional and structural criteria. This constitutes the second level of the product functional hierarchy.

As in the case of the main menu page 10, the available selections provided on the category selection page 40 are preferably provided in the form of controls 42 including the assigned name of each product category, as well as associated short text descriptions 44 of each category and associated images 46.

In a multi-level selection process it is preferred to provide the user with an indication of current level. The category selection page 40 includes two such navigational aids, the first being a level identification bar 48 listing the top level of the hierarchy ("products") and the current selection at the second level of the hierarchy ("captive fasteners"). In addition, a second navigational device, a level identification list 49, a list of all the selections available at the second level of the product hierarchy, is also provided on the category selection page 40.

When the user makes a selection on the category selection page 40, the next level page, the product class or series selection page 50, is displayed as shown in Fig. 8. The product class selection page 50 represents the third level in the product hierarchy. The product selection page 50 provides a plurality of product classes falling within the product category chosen at the upper or "parent" hierarchy level on the category selection page 40. For example, when the product category "captive screws" is chosen, the product classes or series "restricted access series," "stylized knob series," "miniature series," "miniature low profile series," "polished spring ejection series," "flush series," and "basic series," are displayed. Selectable product group controls 52 bearing the name given to each product class or series are associated with each of the product groups displayed on the product class selection page 40. Descriptive text 51 and images 53 are associated with each of the product class controls 52 displayed on the product class selection page 50 to aid the user in choosing a specific product class or series. The product class selection page 50 also includes a menu bar 54, a level identification bar 56 and a level identification list 58 for navigation purposes.

When the user makes a selection on the product class or series selection page, the next level page, the specify criteria page 60, is displayed as shown in Fig. 9. For example, when the user selects the "stylized knob series" on the product series selection page 50 the specify criteria page 60 is displayed providing selection information specific to the "stylized knob series." The selection information is presented to the user in the form of a plurality of sets of selection controls 62. As shown in Fig. 9 the controls can be graphic controls 64 such as clickable images, text-based controls 66 such as drop-down boxes, or both. The specific selection controls 62 presented on the select criteria page 60 depend on the identity of the product series chosen by the user. The specific selection criteria implemented by the controls depend upon the product options available. In the case of the "stylized knob series," seven different selection criteria are provided, reflecting the availability of seven different types of product options for the stylized knob series of captive screws. These selection criteria include (1) the "OP thickness", the thickness of the "outer panel", the panel in which the product is mounted; (2) the thread size of the screw portion of the captive screw; (3) the finish employed on the product (e.g. natural or coated with a black finish); (4) the knob style (whether the knob portion of the captive screw

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is knurled for a better grip or is smooth), (5) the installation style (the manner in which the fastener is mounted on the panel in which it is installed); (6) the recess style (the type of recess formed in the screw head for receiving a tool to tighten or release the captive screw after it has been installed); (7) the screw
5 projection, or how far the screw portion of the captive screw projects below the panel after the captive screw has been installed.

Some of these selection criteria, such as the "OP thickness," thread size, finish, and knob style are implemented as text based controls, in which a drop-down box provides the user with a limited set of alternative values. Other
10 selection criteria, such as the installation style and the recess style, are implemented as a set of clickable image controls presenting a limited set of alternative values to the user.

In the case of the "screw projection" selection criterion, the criterion is implemented as a pair of text-based controls, namely drop down boxes.
15 However, the alternative values presented in each of the drop down boxes cannot be independently specified. Once a value is chosen in one of the two drop-down boxes, a corresponding related value is fixed for the other drop-down box. In addition, in order to help the user understand the significance of this selection criterion, a set of images illustrating the significance of the criterion is
20 provided adjacent the drop-down boxes.

A unique part number is defined for each of the individual products that can be selected using the select criteria page. As an aid for the user in locating a product using the selection criteria page 60, a control 68 is provided displaying the total number of parts available for selection. Before the user chooses any of
25 the selection criteria, the total number of parts available for selection may be a large number. For example, in the case of captive screws, the total number of parts available for selection is initially 5600. Every time one of the alternative values for a specific selection criterion is chosen, the total remaining number of parts available for selection is computed and displayed. For example, when the
30 user chooses one of the alternative values for the installation style selection criterion, for example, the "flare-in" style, the total number of parts available are reduced by the number of parts having other installation styles. The total remaining number of parts displayed by the control is computed based on the total number of flare-in style parts.

- 17 -

A graphic or visual indication is provided to the user that a choice has been made for a particular selection criterion. In the case of clickable images, the images that have not been selected are displayed as "hidden" images (faint compared with the selected image) to signify that they are not available for selection.

Importantly, to the extent that the choice of a specific alternative of one of the selection criteria limits the alternatives available for other selection criteria, the alternatives for these other selection criteria are also displayed in a manner indicating that they are no longer available for selection. Thus, the user cannot choose a set of alternatives from among the selection criteria to define a part that is not actually available.

For example, if the user were to choose the "P.C.Board" alternative from the installation style selection criteria, the other alternatives, graphical representations of the "Press-In," "Flare-in," "Floating," and "Snap-in" installation styles would be displayed as faint images indicating that these installation styles were no longer available, in that another alternative had been selected. In addition, if the only recess styles actually available for captive screws having a "P.C. Board" installation style were "Slotted" and "Phillips," "Slotted" and "Phillips" would continue to be displayed as conventional clickable images. However, the graphic representations for the "Torx," "Torx/Slot Combination," and "Phillips/Slot combination" would now be displayed as faint images indicating that these recess styles were no longer available for selection, the "P.C. Board" installation style having been selected.

Similarly, as each additional available alternative is chosen, the alternatives shown for each of the remaining selection criteria are provided to reflect the actual products remaining which can be chosen by the user. In some cases, only a few alternatives will be shown for one or more of the remaining selection criteria, reflecting the fact that the set of alternatives already chosen substantially limits the universe of actual products that the user can choose.

Advantageously, the user is not permitted to choose a combination of alternatives from among the selection criteria that do not correspond to an actual product.

"Actual product" preferably corresponds to a standard item. The standard item can be a product that is maintained in stock or a product that has

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previously been manufactured and for which manufacturing drawings, bills of material, assembly instructions and the like already exist.

The selection criteria page 60 is also provided with a part number list control 79 for displaying a list of part numbers corresponding to the universe of selected products, and a product literature control 72 for displaying detailed product literature relating to the selected product or products. Once a user has narrowed her selection sufficiently depending on her purpose, she can activate the part number list control 68, which is linked to selected product list page 80 (Fig. 10), for displaying the part numbers of the selected products, or she can activate the product literature control 72 that is linked to a product literature display page 74 (not shown). The product literature display page 74 can include product literature stored in conventional Adobe® pdf format. The selected product list page 80 includes displays a graphic representation 82 of each selected product, a list of the set of criteria uniquely identifying the product selected 84, and a corresponding part number 86 in the form of a selectable link to a selected product detail page 90 (Figs. 11a and 11b) giving detailed information concerning the product.

The selected product detail page 90 provides a list of features 92 of the selected product, a list of attributes 94 of the selected product, a sectional drawing 96 showing key dimensions for installation of the selected product, an explanation about how the selected product can be installed 98, etc.

A product hierarchy can be summarized in the form of a list or spreadsheet showing the hierarchical relationships along with a summary of the presentation of the hierarchy as provided by the present invention. An exemplary excerpt of such a hierarchy summary is provided in Fig. 12. At the upper levels of the hierarchy, hierarchy pages or screens are provided for each node. As indicated in Fig. 12, at the lowest level of each branch of the product hierarchy, select criteria pages or screens are provided, as well as detail pages or screens for providing the user with detailed information concerning the product or group of product selected, and list pages or screens for providing the user with a list of the part numbers of all the individual products meeting the set of criteria selected by the user. The spreadsheet also includes information about product literature in the form of "pdf" files corresponding to specific products or product groups, as well as an identification of the source (e.g. current printed catalog) of the pdf files.

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The present invention also provides a product database management ("PDM") system for maintaining, modifying and correcting the product information.

The PDM system includes a plurality of pages for maintaining the hierarchies into which the products are organized and for maintaining the detail templates associated with the display of product information for specific products.

The PDM system includes a Hierarchy Maintenance page 100, such as shown in Figs. 13 and 14, having a command bar 110 including a plurality of controls 112 for maintaining a hierarchy 130, such as a product hierarchy or application hierarchy, including a plurality of selectable nodes 132, a first pane or window 134 for displaying a hierarchy tree 136, and a second pane or window 140 for displaying information concerning the node 132 selected of the hierarchy tree 136 selected in the first window 130. The hierarchy maintenance page 110 also includes a control 105 for selecting the language in which textual information about the hierarchy and its nodes 132 is displayed. Examples of textual material for which the language can be selected include the hierarchy tree 136, which itself includes a plurality of textual labels 138, shown in the English language in Fig. 13.

The command bar 110 includes a control for refreshing the display 114, adding a new node to the hierarchy 116, editing a selected node of the hierarchy 118, deleting a selected node from the hierarchy 120, reordering the subnodes of a selected node of the hierarchy 122, exporting data relating to the hierarchy, 124, setting up the hierarchy 126 and exiting the PDM hierarchy page 128.

The hierarchy tree displayed in the hierarchy window can include a plurality of expandable branches, reflecting the relationships among the multiple levels of the hierarchy. Individual nodes of the hierarchy tree can be selected, such as shown in Fig. 13. A visual cue or indication that a specific node has been selected is provided in the hierarchy window, such as by highlighting the text label associated with the selected node. Information about the selected node is then displayed in the second window 140. In the case of a product hierarchy, this information includes the name of the product or product group associated with the node, a description of the product or product group associated with the node, a photo or other image of the product or products

- 20 -

associated with the node, the number of "children" to the node (that is, the number nodes on the next lower level linked directly to the node, and an indication as to whether the node is on the lowest relative level in this branch of the tree or whether there are child nodes. In addition, the information about the type of link from the node can be provided, as well as the name of the file containing product literature stored in conventional Adobe® pdf format.

Specific products lie at the nodes at the lowest level of the hierarchy.

The present invention dynamically assembles information responsive to user inquiries for subsequent transfer to the user using a plurality of templates. Thus, the various pages discussed above are generated using corresponding templates. In addition to providing means for managing and maintaining hierarchies, the product database management aspect of the present invention also provides means for managing and maintaining the templates used to provide product information to the user.

The PDM system includes a Template Manager having a plurality of associated pages, such as a Template Manager – Edit page 200, shown in Fig. 15, for editing the various templates. The Template Manager – Edit page 200 includes a language selection control 202, a name control 204 for editing the name of the template of the template, and a corresponding description control 206 for editing the description of the template. The template is also identified by a template type name (for example, "menu template," "detail template"), and a unique identifying number (for example, "1006-MNU1," "CAP-DET-000001").

The Template Manager – Edit page or form 200 permits each data element or component displayed by the respective template to be edited. The components are grouped by data type, such as text, numeric, picture and text plus numeric. The grouped components are displayed as a plurality of tabbed subforms 210, the components 212 being listed on each of the respective subforms 210. The components 212 vary in scope, and may be global, product generic, or template specific. The Template Manager – Edit page 200 includes a plurality of controls including a control for adding a component to the template 220, component editing control 222, a component deletion control 224, a control 226 for displaying the usage of the component, as well as controls for special functions 228 such as batch translation of component text and import of component text from external sources such as external databases, and a control for exiting the page 230.

Various other modifications can be made in the details of the various embodiments of the apparatus of the present invention, all within the scope and spirit of the invention and defined by the appended claims.

CLAIMS

We claim:

1. An interactive product selection system for choosing an access hardware product, the system comprising:
 - (a) a hierarchical database including a plurality of levels and a plurality of nodes, the database including
 - (1) a unique part number assigned to each access hardware product, each part number being assigned to a specific node in the hierarchy.
 - (2) information relating to each such access hardware product including at least one keyword identifying each such access hardware product, said keyword being associated with a respective part number;
 - (b) means for assembling information relating a specified product for display responsive to a user query, the user query including at least one product selection criterion;
 - (c) at least one template for formatting the assembled information for display; and
 - (d) means for dynamically formatting the at least one template for displaying the assembled information.
2. A system according to claim 1 wherein the assembled access hardware product information is displayed as an HTML page.
3. A system according to claim 1 wherein each template has a characteristic type, the templates being organized into categories depending on their type.
4. A system according to claim 1 wherein each template provides at least one data component.
5. A system according to claim 4 wherein each component is selected from the group comprising text, graphic, numeric information, and text with embedded numeric data.
6. A system according to claim 1 wherein textual information is provided in each of a plurality of supported languages.
7. A system according to claim 1 further including a search facility for identifying access hardware products.

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8. A system according to claim 7 wherein the access hardware products are identified by keyword.
9. A system according to claim 7 wherein the access hardware products are identified by product attributes.
10. A system according to claim 7 wherein the access hardware products are identified by intended application.
11. A system according to claim 1 wherein the means for assembling information relating a specified product for display responsive to a user query comprises an SQL call.
12. A system according to claim 4 wherein at least one data component is provided by a plurality of templates, each such template relating to a specific product, the at least one data component including information applicable to each such specific product.
13. A system according to claim 1 wherein the user query is limited to a predetermined universe of access hardware products.
14. A system according to claim 13 wherein the user query is limited so that it is not possible for the user to choose a set of selection criteria that result in no products being identified.
15. A system according to claim 1 further comprising a product database management subsystem providing rapid and facile maintenance, the subsystem comprising
 - means for adding and removing products from the hierarchy;
 - means for modify the nature and description of the product attributes and applications; and
 - means for modifying the universe of selections corresponding to the modified nature and description of the product attributes and applications.
16. A system according to claim 15 wherein the subsystem further comprises means for adding text description in additional languages.
17. An interactive, on-line catalog comprising a product selection guide system according to claim 1.
18. A catalog according to claim 17 wherein at least a portion of the database is provided on media selected from the group comprising optical media and magnetic media.
19. A catalog according to claim 18 wherein the optical media comprises a CD-ROM.

Fig. 1

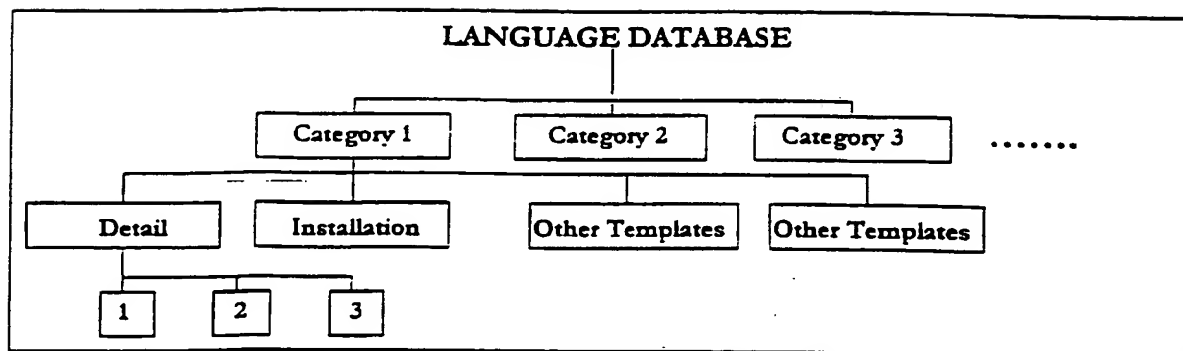
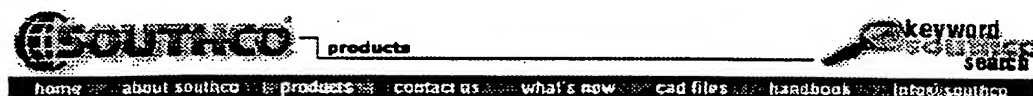


Fig. 5

Language Selection



Please select the language
 Bitte wählen Sie eine Sprache
 Sélectionner la langue
 Seleccione el idioma
 Selezionare la lingua



Fig. 2

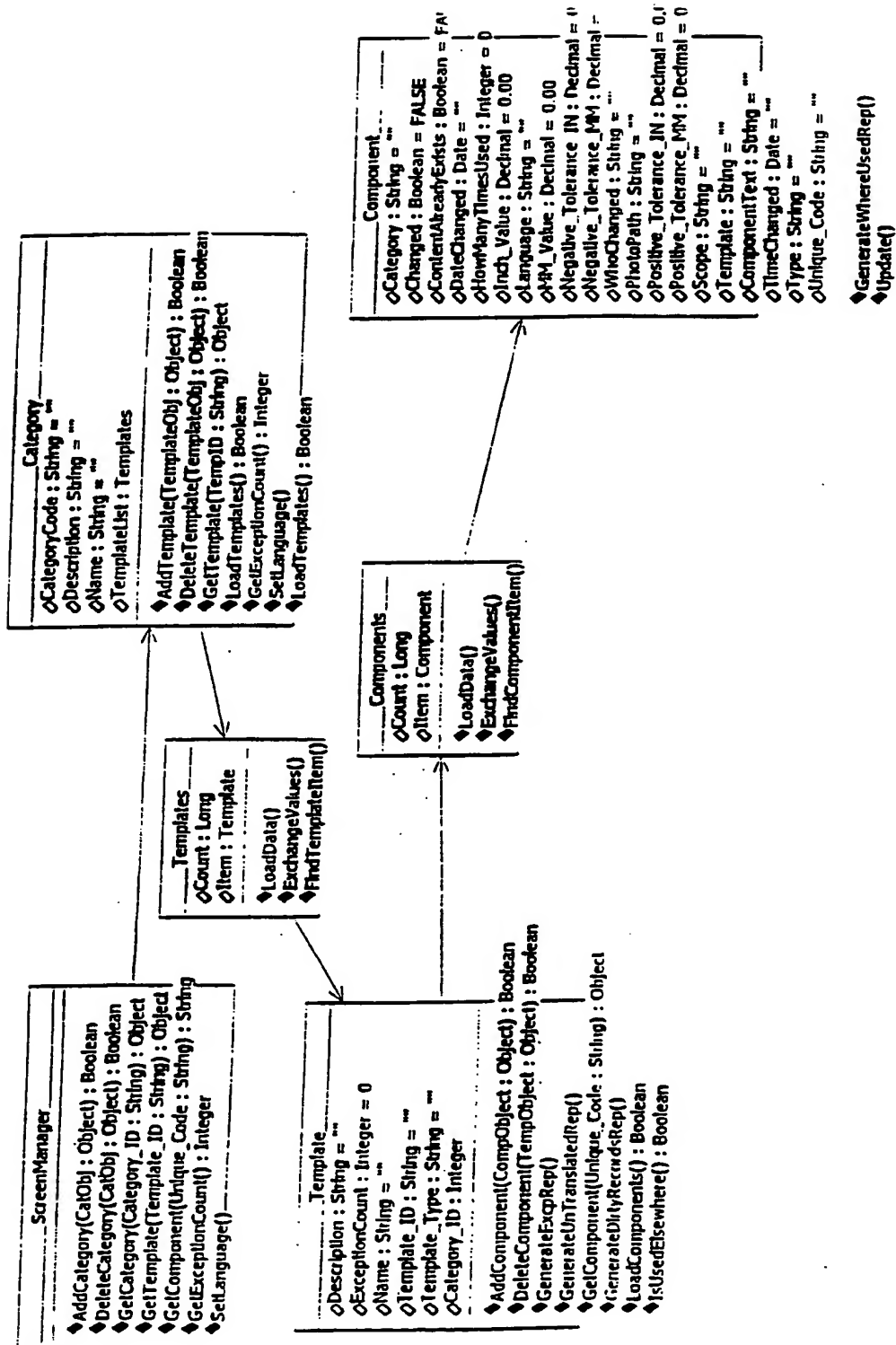


Fig. 3

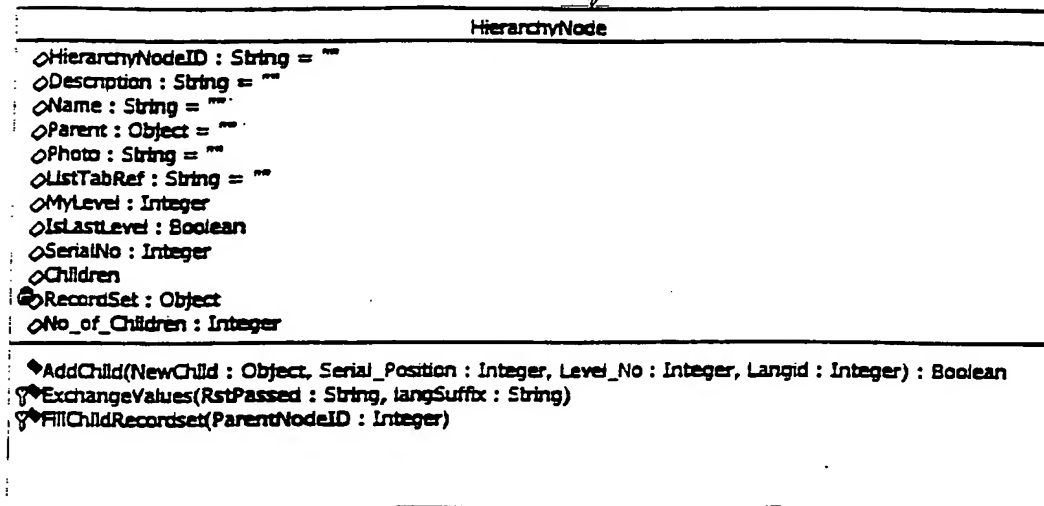
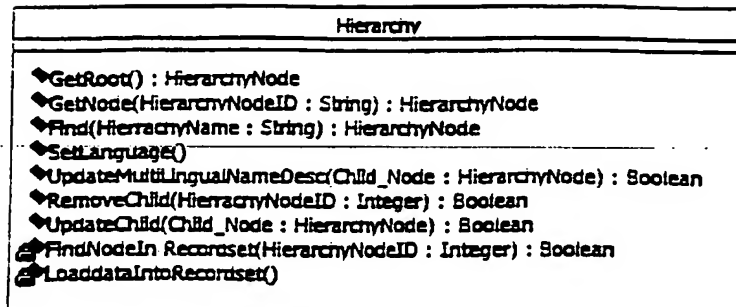


Fig. 4

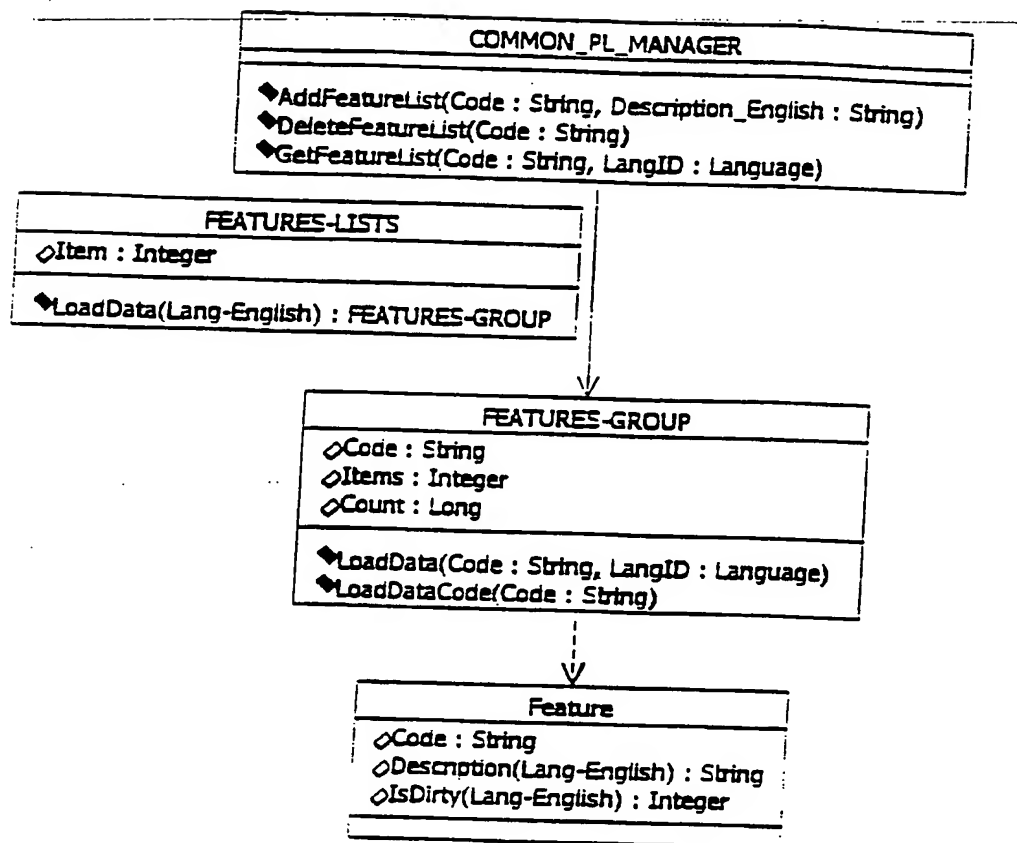
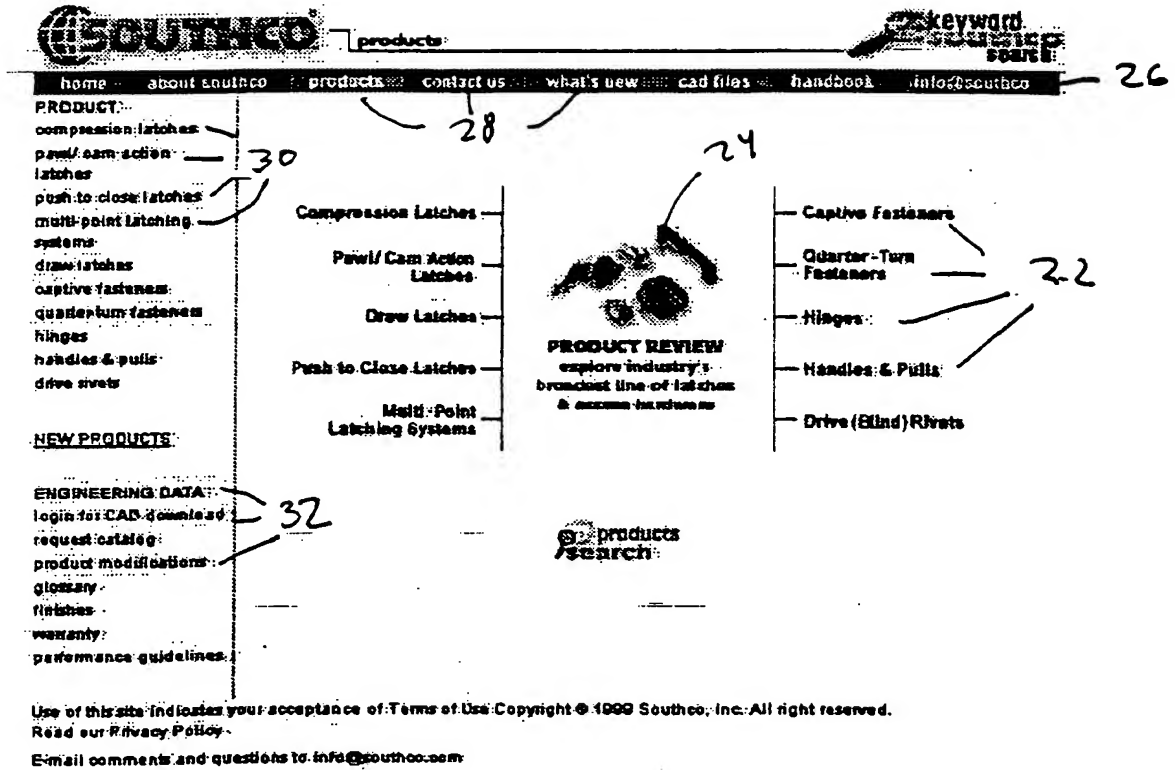


Fig. 6



Product Hierarchy

Fig 7

SOUTHCO products keyword search

home about southco products contact us what's new cad files handbook info@southco

PRODUCTS
[compression latches](#)
[panel cam latches](#)
[draw latches](#)
[push to close latches](#)
[multi point latching systems](#)
[captive fasteners](#)
[quarter turn fasteners](#)
[hinges](#)
[handles & pulls](#)
[snaps \(blind\) rivets](#)

Captive Fasteners

Avoid the problems of lost, dropped or misplaced hardware • Captive to the panel • Wide variety: standard thread, fast-lead thread, inserts, and plungers

• [Captive Screws](#) • [Captive Nuts](#) • [Inserts](#) • [Fast-Lead Thread Screws](#) • [Spring-loaded Plungers](#)

CAPTIVE SCREWS

• Industry's widest variety of captive screw styles • Metric and Imperial thread sizes

CAPTIVE NUTS

• Fasten to externally threaded studs • Spring-ejected • Helps speed panel replacement • Knurled knob provides solid grip

INSERTS

• Internally threaded components • Will not mar finished surfaces

FAST-LEAD THREAD SCREWS

• Fast-lead threads travel twice as fast as standard threads • Resist cross-threading • Quick access • One screw assembly fastens a range of thicknesses

SPRING-LOADED PLUNGERS

• Provide quick release of sliding parts • Act as a locator or hinge pin for removable doors • Available with or without hold-open feature

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Product Hierarchy

Fig 8

SOUTHCO products **keyword search**

home about southco products contact us what's new cad files handbook inter@southco

products > captive fasteners > captive screws

Captive Screws

- Industry's widest variety of captive screw styles • Metric and Imperial thread sizes
- [Restricted Access Series](#) • [Styled Knob Series](#) • [Miniature Series](#) • [Miniature Low Profile Series](#) • [Flush Series](#) • [Polished Spring-Ejected Series](#) • [Polished Series](#) • [Basic Series](#)

RESTRICTED ACCESS SERIES

- Reduces the risk of unauthorized access • Meets UL 1950, IEC 950 and EN 60950 • Hand-operation with tool-only removal

STYLED KNOB SERIES

- Designed for hand operation • Spring-ejected • Wide variety of sizes, recesses and installation options

MINIATURE SERIES

- Smaller footprint for limited space applications

MINIATURE LOW PROFILE SERIES

- Smaller footprint for limited space applications • Low profile when fastened

FLUSH SERIES

- Flush when fastened

POLISHED SPRING-EJECTED SERIES

- Highly polished appearance

POLISHED SERIES

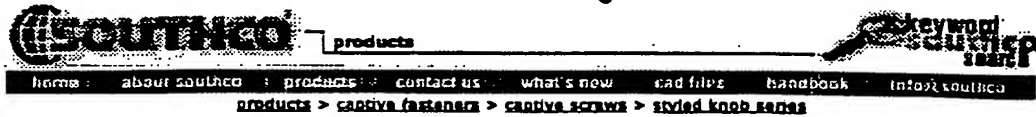
- Simple design • Highly polished appearance

BASIC SERIES

- Generous knob for hand operation • Highly polished appearance • Captivated by retainer

47- Styled Knob Series Specification Criteria Screen

Fig. 9



Styled Knob Series - Specify Criteria

Find the best product for your application, fast. Simply select criteria from the drop-down boxes or clickable images to narrow down the quantity of available part numbers. Click view part numbers to continue.

Available Part Numbers:

[View Part Numbers](#)
[View Product Literature \(pdf\)](#)

OP Thickness:

Thread Size:

Finish:

Knob Style:

Installation Style: (Click Photo)

Press-in	P.C. Board	Flare-in	Floating	Snap-in

Washer

Recess Style: (Click Photo)

Slotted	Phillips	Torx®	Torx®/Slot Combination	Phillips/Slot Combination

(Flare-in style shown)

Screw Projection:

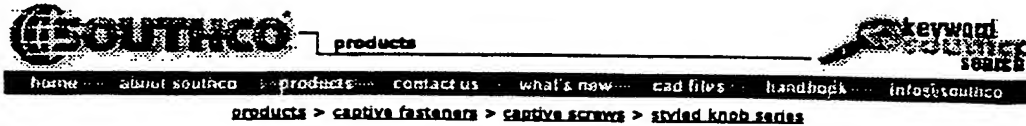
UNFASTENED	UNFASTENED	FASTENED
P-1 (Flare)	P-2 (Projected)	P-2

Available Part Numbers:

[View Part Numbers](#)
[View Product Literature \(pdf\)](#)

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Fig. 10



Styled Knob Series - 10 options are listed below.

Southco presents the following product options for your application. The application criteria is as specified below. Click on a part number to review details.

Thread Size: 10-32 - Knob Style: Smooth - Installation: Flare-in - Finish: Black - Outer Panel Thickness: Not Specified - Recess Style: Torx®


82		<u>47-10-548-51</u> — 86 — 84 Panel Thickness : 6.3 (.251)-7.9 (.312), Knob Style : Smooth, Recess Style : Torx®
		<u>47-10-542-51</u> — 86 — 84 Panel Thickness : 1.5 (.058)-3.2 (.125), Knob Style : Smooth, Recess Style : Torx®
		<u>47-10-544-51</u> Panel Thickness : 3.2 (.126)-4.7 (.187), Knob Style : Smooth, Recess Style : Torx®
		<u>47-10-546-51</u> Panel Thickness : 4.8 (.188)-6.4 (.25), Knob Style : Smooth, Recess Style : Torx®
		<u>47-11-542-51</u> Panel Thickness : 1.5 (.058)-3.2 (.125), Knob Style : Smooth, Recess Style : Torx®
		<u>47-11-544-51</u> Panel Thickness : 3.2 (.126)-4.8 (.187), Knob Style : Smooth, Recess Style : Torx®
		<u>47-12-544-51</u> Panel Thickness : 3.2 (.126)-4.8 (.187), Knob Style : Smooth, Recess Style : Torx®
		<u>47-11-546-51</u> Panel Thickness : 4.8 (.188)-6.4 (.25), Knob Style : Smooth, Recess Style : Torx®
		<u>47-12-542-51</u> Panel Thickness : 1.5 (.058)-3.2 (.125), Knob Style : Smooth, Recess Style : Torx®
		<u>47-13-542-51</u> Panel Thickness : 1.5 (.058)-3.2 (.125), Knob Style : Smooth, Recess Style : Torx®

Detail Screen

SOUTHCO products **keyword search**

home about southco products contact us what's new cad files handbook info@southco.com

products > captive fasteners > captive screws > styled knob series



Styled Knob Series - 47-12-542-51

Southco® Captive Fasteners - Styled Knob Series, 10-32 Thread Size

[features](#)
[attributes](#)
[sectional drawing](#)
[installation](#)
[screw projection](#)
[material finish](#)
[notes](#)

[literature page \(pdf\)](#)
[product drawing \(pdf\)](#)

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[request sample](#)
[request product modification](#)

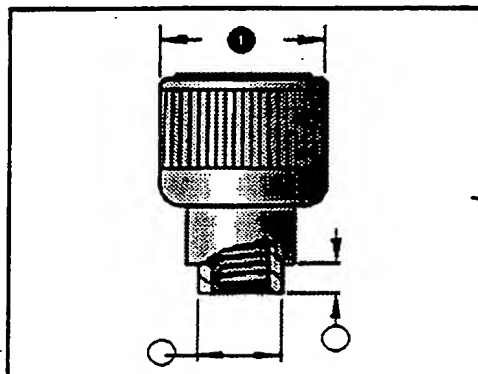
[accessory](#)
[standard finishes](#)
[warranty](#)
[performance guidelines](#)

FEATURES :

- Spring - ejected.
- Test feature
- Designed for hand operation.
- Wide variety of sizes, recesses and installation options.

ATTRIBUTES :

Fully Retractable :	No	Knob Style :	Smooth
Thread Size :	10-32	Finish :	Black
Installation :	Flare-in	Outer Panel Thickness (Max.) :	3.2 (.125)
Recess Style :	Torx®	OP Thickness (Min.) :	1.5 (.058)

SECTIONAL DRAWING :

1	Ø13 (.51)
2	1.8 (.07)
3	0.4 (.015)

INSTALLATION :**Flare-in Style**

1. Prepare panel as shown
2. Install tool in suitable press. Only LIGHT pressure will be required.
3. Insert screw assembly into prepared hole in panel.
4. Place work under press, center tool over screw thread and force ferrule into counter sink

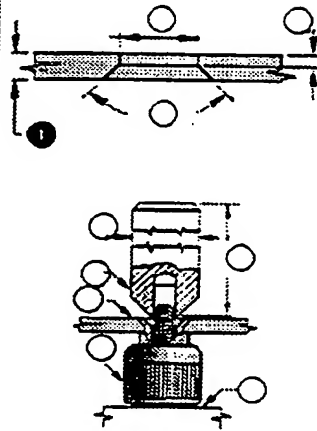
▲ [Back To Top](#)

Fig 11a

Detail Screen

Fig. 11b

in panel. Use LIGHT pressure



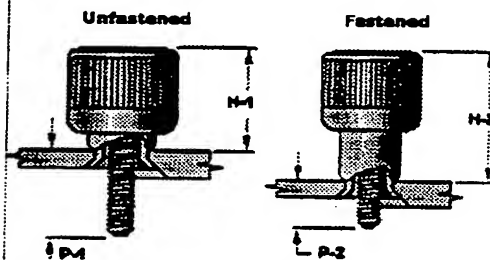
1	Ø13 (.51)
2	90°±2°
3	Ø6.8 (.26) -0.08 (.005) -0.04 (0)
4	0.4 (.015)
5	11.9 (.47)
6	102(4.0)
7	TOOL
8	PANEL
9	SCREW ASSEMBLY
10	Smooth back-up surface

Notes :

Installation Force 1600 N(350 lbs.) to 2500 N(55 lbs.)

▲ Back To Top

SCREW PROJECTION :



KNOB HEIGHT		Screw Projection beyond outer surface of panel	
H-1	H-2	P-1(Flush at minimum panel thickness)	P-2(Projection beyond minimum panel thickness)
15.6 (.61)	10.5 (.41)	4.4 (.17)	9.5 (.37)

▲ Back To Top

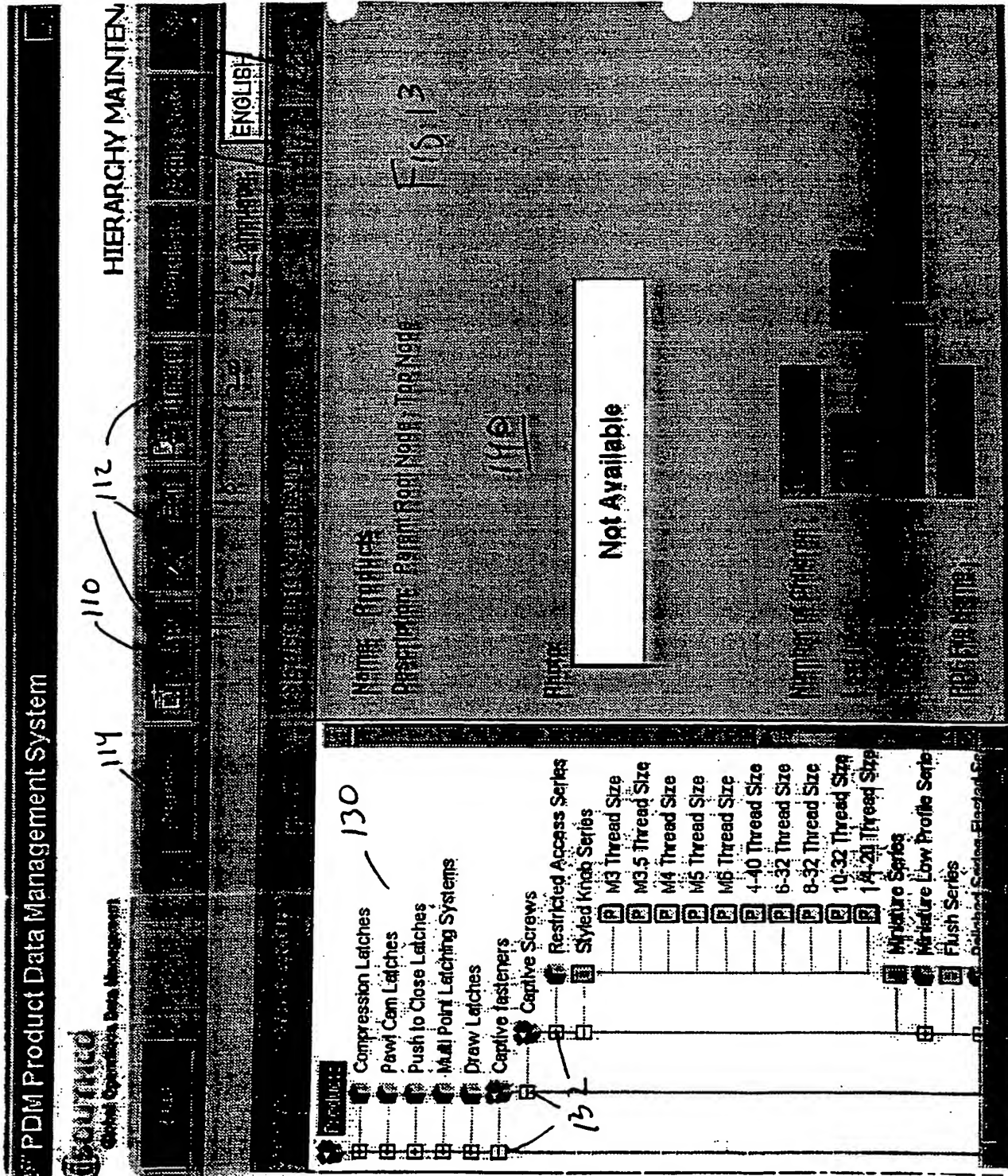
MATERIAL FINISH :

KNOB	6000 Series Aluminium, black powder coated.
FERRULE	6000 Series Aluminium, natural
SPRING	(Internal component, not shown) 300 Series stainless steel, passivated.

▲ Back To Top

Fig. 12

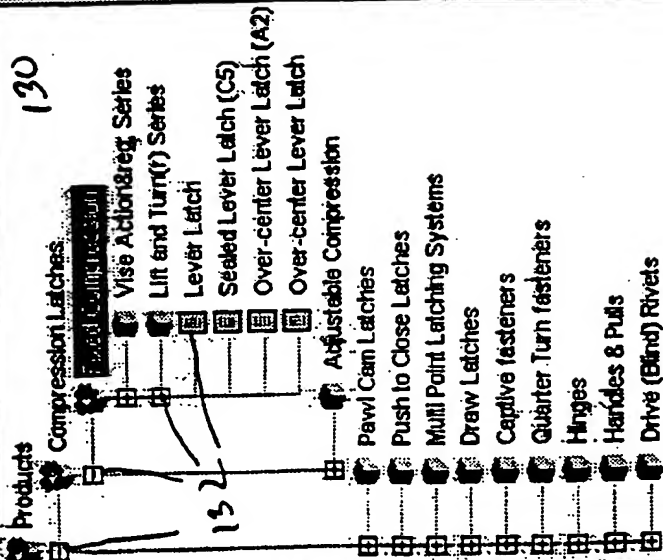
Product Hierarchy		Product Literature URL (common prefix for all, US version)	
Web Presentation	Product Hierarchy	Product Literature URL (common prefix for all, US version)	Product Literature URL (common prefix for all, US version)
HP= Hierarchy page, SC= Select Criteria, LS= List Screen, DS= Detail Screen, PDF= Literature .pdf		http://www.southco.com/pdf/uspdf/	http://www.southco.com/pdf/uspdf/
		(example: http://www.southco.com/pdf/uspdf/1111.pdf)	
HP	6 Captive Fasteners		
HP	6.1 Captive Screws		
SC/LS/DS & HP/PDF	6.1.1 Restricted-access Series (47)		
PDF	6.1.1.1 M4 and M5 Thread Sizes	6111.pdf	198, 199, 202
PDF	6.1.1.2 6-32, 8-32, and 10-32 Thread Sizes	6112.pdf	200, 201, 202
SC/LS/DS & HP/PDF	6.1.2 Flyed-knob Series (47)		
PDF	6.1.2.1 M3 Thread Size	6121.pdf	204, 205, 224, 225
PDF	6.1.2.2 M3.5 Thread Size	6122.pdf	208, 207, 224, 225
PDF	6.1.2.3 M4 Thread Size	6123.pdf	208, 209, 224, 225
PDF	6.1.2.4 M5 Thread Size	6124.pdf	210, 211, 224, 225
PDF	6.1.2.5 M6 Thread Size	6125.pdf	212, 213, 224, 225
PDF	6.1.2.6 4-40 Thread Size	6126.pdf	214, 215, 224, 225
PDF	6.1.2.7 6-32 Thread Size	6127.pdf	216, 217, 224, 225
PDF	6.1.2.8 6-32 Thread Size	6128.pdf	218, 219, 224, 225
PDF	6.1.2.9 10-32 Thread Size	6129.pdf	220, 221, 224, 225
PDF	6.1.2.10 1/4-20 Thread Size	61210.pdf	222, 223, 224, 225
SC/LS/DS & HP/PDF	6.1.3 Miniature Low-profile Series (52)		
PDF	6.1.3.1 Flush Style	6131.pdf	226
PDF	6.1.3.2 Press-In Style	6132.pdf	227
LS/DS & PDF	6.1.4 Miniature Series (52)	614.pdf	228
SC/LS/DS & HP/PDF	6.1.5 Polished Spring-electric Series (53)		
PDF	6.1.5.1 M5 Thread Size	6151.pdf	230
PDF	6.1.5.2 M4, M5, M6 Thread Sizes	6152.pdf	232, 233
PDF	6.1.5.3 4-40 and 6-32 Thread Sizes	6153.pdf	231
PDF	6.1.5.4 6-32, 10-32, 10-24, and 1/4-20 Thread Sizes	6154.pdf	234, 235
SC/LS/DS & HP/PDF	6.1.6 Polished Series (51)		
PDF	6.1.6.1 M3 Thread Size	6161.pdf	236
PDF	6.1.6.2 M4, M5, M6 Thread Sizes	6162.pdf	238
PDF	6.1.6.3 4-40 and 6-32 Thread Sizes	6163.pdf	237
PDF	6.1.6.4 6-32, 10-32, 10-24, and 1/4-20 Thread Sizes	6164.pdf	239
SC/LS/DS & PDF	6.1.7 Flush Series (29)	617.pdf	240
LS/DS & PDF	6.1.8 Basic Series (55)	618.pdf	241
SC/LS/DS & PDF	6.2 Captive Nut (N7)	62.pdf	242
HP	6.3 Inserts		
LS/DS & PDF	6.3.1 Threadstud Threaded Inserts (77)	631.pdf	243
LS/DS & PDF	6.3.2 Threaded Inserts (71/71)	632.pdf	245
LS/DS & PDF	6.3.3 Anchor Nuts (21)	633.pdf	244
LS/DS & PDF	6.3.4 Sheet-edge Insert (F1)	634.pdf	246
HP	6.4 Fastened Threaded Screws		
SC/LS/DS & PDF	6.4.1 Small Size (56)	641.pdf	247, 248, 249
SC/LS/DS & PDF	6.4.2 Medium Size (12)	642.pdf	247, 250, 251
SC/LS/DS & PDF	6.4.3 Large Size (17)	643.pdf	247, 253, 253
SC/LS/DS & PDF	6.5 Spring-loaded Plungers (58)	65.pdf	254, 255



PDM Product Data Management System

Fig 14
114 110 118 120
HIERARCHY MAINTEN

ENGLISH



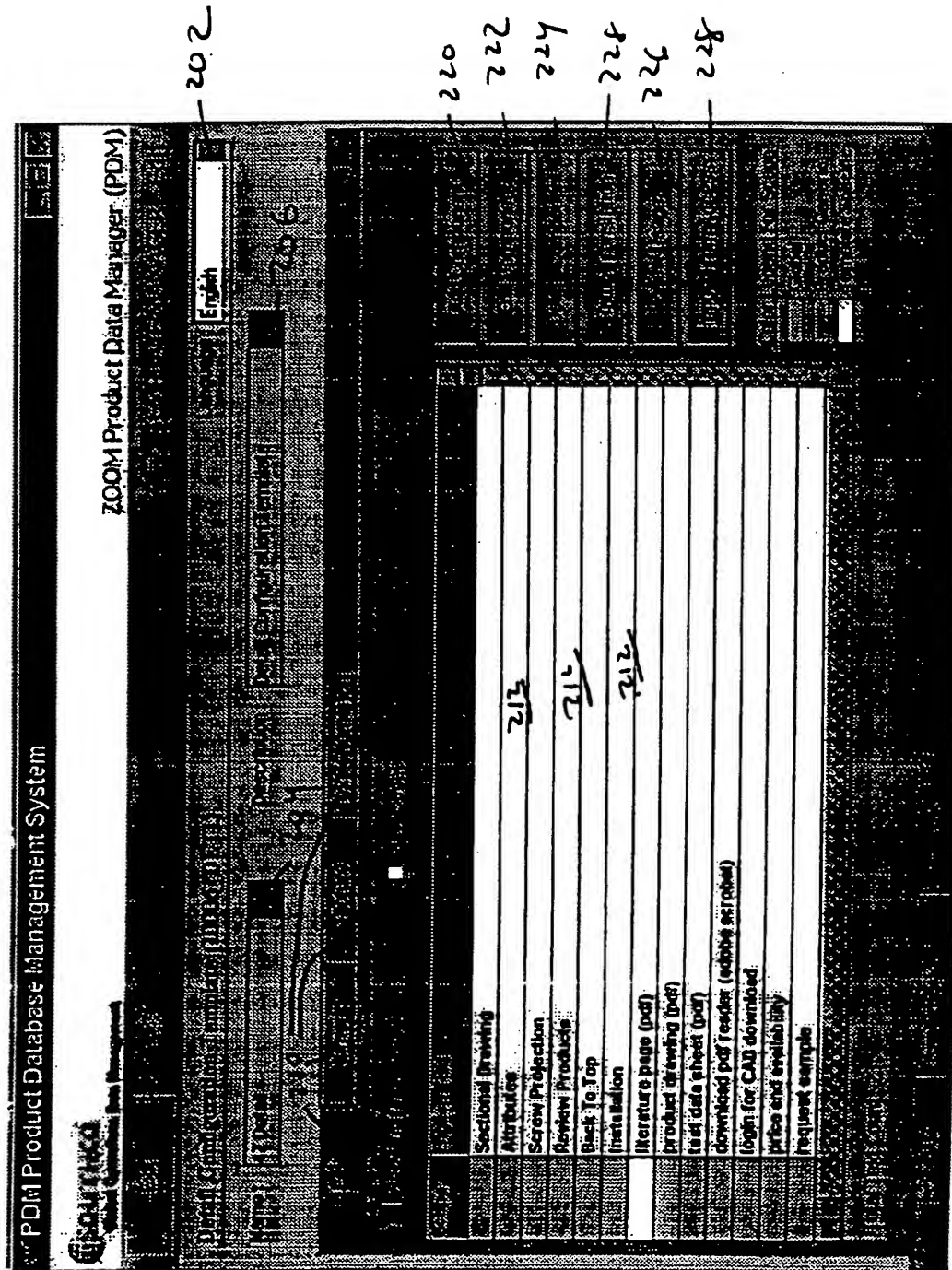
Number of Components

Base Levels

Latch Type

File Path Name

Fig. 15



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